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Did ground sloths survive to Recent times in the Amazon region?

David C. Oren [1]

ABSTRACT — Native Amazonian peoples' descriptions of the "mapinguari," a legendary creature of the rain forest, are surprisingly consistent with the characters expected of a relatively small (approximately 1.8 m), forest-dwelling mylodontid ground sloth (Xenarthra = Edentata: Mylodontidae), suggesting that the widespread mapinguari legend is based on direct human contact with ground sloths in the recent past. Current first-hand reports of mapinguaris in western Amazonia should encourage researchers in the area to search for evidence of the possible continued existence of the source of the legend.

KEY WORDS: Xenarthra, Mylodontidae, Amazonia, sloths, mapinguari, mammals, folklore, legends.

RESUMO — As descrições do "mapinguari", um animal lendário da floresta amazônica, dadas por povos nativos da região, são surpreendentemente consistentes com os caracteres esperados num representante florestal relativamente pequeno (aproximadamente 1,8 m) das preguiças terrestres da família Mylodontidae (Xenarthra = Edentata), o que sugere que a lenda tenha base no contato direto entre seres humanos e preguiças terrestres no passado recente. Relatos de primeira mão oriundos do oeste da Amazônia devem incentivar pesquisadores na região a levar essas informações mais a sério e a fazer esforços para procurar evidências de uma possível existência atual da fonte da lenda.

PALAVRAS-CHAVE: Xenarthra, Mylodotidae, Amazônia, preguiças, mamíferos, mapinguari, folclore, lendas.

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INTRODUCTION

Throughout Brazilian Amazonia, local people of the countryside tell tales about a creature known as the "mapinguari," a human-sized animal characteristically described as having long reddish fur, a monkey-like face, feet "turned backwards," a voice that is extremely loud and similar to a human shouting or, alternatively, "like thunder," extraordinary strength, a very tough skin, and crepuscular or nocturnal habits. To most Amazonians, this animal is a legend, a creation of the human imagination used to frighten children so that they do not wander unaccompanied into the forest. To other Amazonians, this creature is quite real.

A number of compilers of Amazonian folktales (*e.g.*, Câmara Cascudo 1954, Heuvelmans 1959, Smith 1983, *in press*, Oliveira 1984) have described the mapinguari as a large ape-like creature, not unlike the yeti of Asia or "big-foot" of the Pacific Northwest of the United States and adjacent Canada. From the time of my own first field work in the Brazilian Amazon in 1977, I heard many tales of the mapinguari, part of the panoply of fabulous creatures that supposedly inhabit the most remote parts of the Amazon rain forest, and I always considered the mapinguari to be purely mythical. David Guciros Vieira of the History Department of the University of Brasília, and ex-Vice Director of the Museu Paraense Emílio Goeldi in Belém, first brought my attention to the fact that many reliable contemporary Amazonians have stories of first-hand contact with the mapinguari. Vieira was chief administrator of the Serra Pelada mine in southeastern Pará, Brazil for more than a year and collected several stories from gold miners who claimed to have seen this animal. It was during discussions with Vieira that I realized that the creature described as the mapinguari was not a primate, but almost certainly a ground sloth. Since my discussions with Vieira, I have travelled to regions where this creature has been reported, interviewed people who have claimed to have seen it or evidence of its activity (feces, tracks and damage to food plants), and have come to the conclusion that the mapinguari is a member of the giant ground sloth group, that it has very recently gone extinct in the majority of the Amazon region, and may still survive in small numbers at least in westernmost Brazilian Amazonia, in the states of Acre and Amazonas.

GROUND SLOTHS IN NORTH AND SOUTH AMERICA

The ground sloths are members of the suborder Pilosa of the Xenarthra (Edentata), a group which underwent extraordinary evolutionary radiation in South America after the breakup of Gondwanaland (Vaughan 1987). Three different families of ground sloths are known as fossils: Megatheriidae, Mylodontidae, and Megalonychidae. Most of them were large and massively built, and some of the megatheriids reached the size and even exceeded that of modern elephants. Most authors give a South American origin to all three ground sloth

families (Patterson & Pascual 1972), although the existence of megalonychids in the Caribbean and North America before the Panama land bridge was complete has led to speculation that this family was of Caribbean origin, rather than South American (Engelmann 1985). The relationships of the ground sloths with the existing two genera of tree sloths, *Bradypus* and *Choloepus*, are controversial, but most specialists today agree with the "Patterson-Pascual" hypothesis proposed by these two authors in 1968, that *Bradypus* is related to the megatherioid ground sloths, while *Choloepus* is closest to the megalonychids; this hypothesis recently received convincing reinforcement through studies by Webb (1985).

First through waif distribution, and then more abundantly after the completion of the Panamanian Isthmus between North and South America approximately 2.5 million years ago, ground sloths spread north. As far as is known today, ground sloths went extinct in North America around 11,000 years ago, coinciding with the expansion of human populations there, which probably found these large, lumbering creatures easy prey in spite of the sloths' massive builds and huge claws. In addition to fossilized remains, ground sloths have been found in mummified and semi-mummified states in both North America and South America. The Shasta Ground Sloth (*Nothrotheriops shastense*) left huge deposits of coprolites (fossil fecal remains), in one case at least 7 m deep, in caverns in North America. It is supposed that ground sloths went extinct in South America somewhat later (approximately 8,500 years ago), although Ameghino (1898, 1899) at one point in his career advocated the position that the remains of ground sloths found in caves in Argentina were modern. The material on which Ameghino based his conclusions was later shown to have originated from an archeological site where ancient humans had killed and eaten ground sloths, rolling up sections of sloths' skins and burying them within the cave, for what purpose is unknown (Heuvelmans 1959). The mummified and semi-mummified remains created considerable stir in the scientific world at the time they were discovered. Consensus today, however, is that all ground sloths are extinct and that their remains found in caverns and other fossiliferous sites in both Americas represent the last testimony of these remarkable creatures which may already have been on their way out when humans arrived, and that the hunting pressure brought on by ancient human colonization of the New World finished them off (Martin & Wright 1967).

MAPINGUARIS AS REMNANT GROUND SLOTHS

Despite my own skepticism and initial incredulity, I have come to the conclusion that the descriptions regional Amazonian folk give of mapinguaris fit precisely what is expected of a small, forest-dwelling mylodontid ground sloth.

Every witness I have interviewed has given very similar descriptions: long reddish fur, terrifying vocalizations, approximately human size, feet "turned backwards," round tracks, and horse-like feces. The damage done to plants includes "twisting" bacaba (*Oenocarpus bacaba*) palm trees to the ground to feed

on the palm heart and the tree's berry-like fruits. The similarity of the descriptions is one of their most intriguing details, as it is virtually impossible for the different individuals interviewed to have had contact with one another and "conspired" to fabricate the same version of a truly mythical creature.

Reddish fur

According to M. McKenna (pers. comm.) of the American Museum of Natural History, who has examined many existing samples of ground sloth fur known from mummified remains, all are reddish in color.

Feet "turned backwards"

The ground sloths apparently walked with their claws curved towards the center of the body, not unlike their xenarthran relatives the tamanduas and anteaters; thus the feet would be expected to be reported as "turned backwards" by witnesses. It is interesting to note that another mythical creature of South America, the "curupira" is also supposed to locomote with the feet "turned backwards." There are even myths of whole tribes of people who supposedly had this part of their anatomy inverted, variously going by the name of "caapora" in Brazil, "máguare" in Venezuela, "cauá" in Bolivia, and "chudiachaque" to the Quechua speakers of Peru (Câmara Cascudo 1954).

Invincibility, vulnerable only "around the navel"

Of the three families of ground sloths, one, the Mylodontidae, had dermal ossicles. A specimen of fossilized skin recently excavated by the Florida State Natural History Museum (Gainesville) in Alachua County, Florida, has the ossicles in their original disposition in the skin. The ossicles are pyramidal in shape and there were at least three separate layers of them in the fossil skin (Webb, pers. comm.). Dermal ossicles in the mummified South American mylodontid specimens are located in the shoulders, back and thighs, making the outer surface of individuals with this feature formidably armored when walking quadripedally. The rib-cages of some fossil ground sloths were formed of ribs that were so close to one another that they were almost imbricated, forming a veritable shield.

The combination of dermal ossicles and shield-like rib-cage conforms to witnesses' accounts that "the only way to kill a mapinguari is to wound it in the belly, around the navel; in the eye; or in the mouth, when it is vocalizing." When shot at with arrows or shotgun blasts in other parts of the body, the creature is reported to produce an extraordinarily loud, human-like scream and move off into the forest, apparently unharmed (or, at least, not mortally wounded).

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Monkey-like face

In artists' reconstructions of what giant ground sloths are supposed to have looked like based on fossil remains, there is none that I have seen with the front part of the head presenting a face particularly "monkey-like." However, even though the existing arboreal sloths, *Bradypus* and *Choloepus*, are considered by taxonomists to belong to separate xenarthran families and are not closely related to one another, both have faces that are very reminiscent of those of primates.

In the legend of the mapinguari (rather than first-hand testimony), the animal is frequently said to have only one eye. The supposed single eye is certainly in conflict with a "monkey-like face," but is so often repeated in literary accounts of the legendary creature that it needs to be treated here. In what seems to be a very convincing explanation (and on the part of someone who certainly never considered the possibility that mapinguari stories were based on human contact with ground sloths), Câmara Cascudo (1954) discussed this feature as a clear hybridization of native Brazilian mythology (mapinguaris) with Portuguese influence, which brought the European myth of the ferocious, one-eyed, man-eating cyclops to Amazonia.

Human size

It is supposed that fossil ground sloths were savanna dwellers. This is based on the creatures' massive size, their dentition, the fossils of associated fauna at paleontological sites, and the detailed studies of the coprolites left by the Shasta Ground Sloth in North America (Martin *et al.* 1963, Hansen 1978). It is a general pattern in mammal groups that have evolved in savannas that forest-adapted forms are smaller in size (giraffes in African savannas, vs okapis in forest; the Pantanal deer in open habitat vs the forest *Mazamas* of South America, for example). Thus, it is to be expected that a forest dwelling ground sloth would be smaller than open country forms. Although 1.8 m length is hardly small by the standards of living South American mammals, it would make the mapinguari one of the smallest ground sloths known.

Tracks

Witnesses describe mapinguari tracks as in two forms: "round as a pestle" and "like people's, but backwards." The description of round tracks is the most common. Witnesses claim that even when the ground is baked hard by the sun in the dry season, that round tracks are found around feces and food plants. McKenna (pers. comm.) of the American Museum stated that we really do not know precisely how ground sloths locomoted, but certainly the famous tracks attributed to ground sloths found in Nevada, USA in the Carson City State Prison yard (Stock 1925) show large, clearly human-like tracks.

Owen (1842), in his beautiful monograph on *Mylodon robustus*, discussed at length the impressive strength of this ground sloth's tail. It would seem logical that the tail was essential for bipedal feeding for these massive, ponderous creatures, providing a more stable, tripod-like base for foraging (the "tripod" being formed in conjunction with the two hind-limbs). It is admittedly speculation on my part, but it seems possible that these round mapinguari "tracks" reported may represent a blunt tail impression, where the bulk of the creature's weight has pressed into the ground during bipedal foraging and during defecation. It may also be possible that locomotor patterns of at least some ground sloths have not been properly interpreted, and that the distal ends of the limbs themselves leave round impressions. This is the most conjectural of the points regarding my interpretation of witnesses' accounts of what they see in the field. If the famous Carson City tracks were correctly interpreted by Stock (1925), the "human-like prints, but backwards," conform well with what would be expected from museum reconstructions of ground sloth skeletons.

Feces

Mapinguari feces are described as "just like horses'." The specimen of *Nothrotheriops shastense* feces I examined at San Diego courtesy of Amadeo Rea looked to me precisely like horse feces, with the individual fecal boli semi-spherical and adherent to those anterior and posterior in the fecal mass. Field witnesses point out that feces attributed to the mapinguari are very different from those of all other Amazonian mammals, with the exception of the Brazilian Tapir (*Tapirus terrestris*), a mammal which usually defecates in water. One feature frequently noted by witnesses is that the leaves and stems of the food plants are often poorly broken down and still recognizable in the mapinguari fecal mass.

Vocalizations

Fossil hyoid bones of extinct ground sloths shown to me at the Florida State Museum are extremely well-developed and can be interpreted to mean that these creatures were probably capable of producing loud vocalizations (S. D. Webb, pers. comm.).

Both species of existing arboreal sloths vocalize. In *Bradypus* the voice is reminiscent of a crying human infant and is rather weak. *Choloepus* has a stronger voice, which is like a fine, high-pitched scream that carries long distances in the forest and is typically given at night. *Choloepus* also produces hissing-like sounds when annoyed.

Two vocalizations are described as being made by mapinguaris. One is low and "like thunder," while the other is higher pitched, carries long distances and is "just like a human shouting." This second vocalization is something that witnesses are most impressed by and terrified of. I heard accounts of people

abandoning their huts in the forest to seek refuge in nearby settlements, and otherwise fearless, experienced hunters abruptly ending their search for game after hearing these vocalizations at night.

Ground sloth biogeography and faunistic wealth

South America is reasonably well-known in terms of its fossil mammals, but geographic coverage is spotty, with many regions still virtually unknown (Patterson & Pascual 1972, Simpson 1980). The center of distribution for ground sloths was clearly South America. Western Amazonia, particularly Acre, Brazil, has been the object of some extremely important paleontological work, which has revealed one of the richest, if not the richest fossil ground sloth fauna on earth (Spillman 1949, Paula Couto 1956, 1983, Simpson & Paula Couto 1981, Rancy 1981, 1991 and pers. comm., Frailey 1986). The paleontological literature cited above records a total of at least eight genera of ground sloths in the Pleistocene of western Amazonia, including two genera of megalonychids, four genera of mylodontids, and two genera of megatheriids. At Rancho La Brea in California, USA, site of some of the most spectacular Pleistocene fossil finds known, there are only three genera of ground sloths represented. With this exceptionally rich ground sloth fauna in the Pleistocene of western Amazonia, it seems reasonable to hypothesize that this region was one of the centers of evolutionary differentiation for the three ground sloth groups. Rancy (1991) has concluded that climate change was an important factor in the disappearance of the rich Pleistocene mammal fauna of western Amazonia, as most of the fossil forms were of open country. If his hypothesis that the region was covered with savanna woodland with a cooler and drier climate than today is correct, the forest environment that dominates the region now is relatively recently formed, but may have been represented during the Pleistocene by gallery forests, much as in the cerrado domain of Central Brazil in modern times. That any late-surviving ground sloth species would have been forest-adapted is not entirely unreasonable.

FACT OR FICTION?

Why has no one previously proposed that the mapinguari stories are based on a remnant form of ground sloth? I believe the reasons for this to be five-fold.

First, there is little doubt in the mind of most Amazonians that the mapinguari is purely legend. Many of those I have interviewed have said "I did not believe in the existence of this animal until I came face to face with it. I was sure it was just one more fantastical tale from the rain forest." Precisely because there is a legend to explain the many sightings of the animal, first-hand testimony is discounted. For each time I was able to get an interview with a local inhabitant regarding mapinguaris, I was laughed at by at least four others. I

might call this the "pink elephant syndrome" ("What is it you'd been drinking just before you saw this thing?").

Second, the creature is described as a giant ape-like beast. A reliable scientist searching for evidence of this animal almost certainly would be looking for a primate or perhaps a bear, not a ground sloth. In fact, all of Heuvelmans' (1959) references to mapinguaris are in his chapter on Neotropical primates, not in his long and insightful chapter on ground sloths. Two respected scientists who have worked recently in western Amazonia heard tales of mapinguaris, but both attributed the stories to possible seasonal movements of Andean bears (*Tremarctos ornatus*) from the cold cordillera during the southern hemisphere winter into adjacent Brazil (Campbell pers. comm., Rancy pers. comm.), even though wild bears have never officially been recorded in Brazil.

Third, mapinguaris are reported as crepuscular and nocturnal. I myself have been impressed by passing through riverine habitat during the day by boat and returning by the same route at dusk. Whereas I might have been lucky to see a sloth or two during the daytime traverse, in the late afternoon the same place can "come alive" as day-slumbering Three-toed Sloths awaken to forage. Since humans are primarily diurnal, nocturnal creatures are largely mysterious or unknown, except to hunters, woodsmen, rubber-tappers and scientists of night-active creatures.

Fourth, this creature is (or was) a formidable beast, heavily armored with dermal ossicles on the shoulders, back and thighs, a shield-like rib-cage, huge claws, and powerful dentition, and rarely killed by humans facing it in its own element, the Amazon rain forest. Most of the people who have reported the animal to me are terrified of it. If they know it is in the area, they make every effort to avoid contact.

Fifth, mapinguari habitat is tropical rain forest. This makes observations difficult and discovery of remains unlikely. With the death of one of these creatures, its remains would rapidly decay in the forest's heat and humidity in spite of the massive armoring. Even if people did find skeletal elements, the possibility that these remains would make it into the hands of a specialist who could recognize their significance would be very small. Furthermore, remnant ground sloth populations may always have had low densities, making human contact with them rare.

CONCLUSION

My major objective in writing this paper is to encourage other researchers working the western Amazonia to take stories of the mapinguari more seriously than they have in the past. The last first-hand reports from Amapá in north-eastern Brazilian Amazonia are from elderly woodsmen. No one, to my knowledge, has a first-hand report from the Tapajós River basin that is less than 20 years old. Existing arboreal sloths have gestation periods of 11.5 months, with

periods between pregnancies estimated at around 14 months (Eisenberg 1981). Long gestation periods, large size, probable large territory size and hostile relations with local human populations are a classical formula for extinction of mammals around the world.

There is little doubt in my mind that the mapinguari legend is based on human contact with forest-dwelling mylodontid ground sloths in Amazonia. Has the creature already gone extinct, do these first-hand stories represent the last sad chapter of our own species' encounters with the ground sloths, or is there still a small, highly endangered population of these "fabulous" creatures left to be studied and protected?

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